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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/828,887	04/21/2004	Yisuo Li	CS03-028	5854

7590 10/19/2006

STEPHEN B. ACKERMAN  
28 DAVIS AVENUE  
POUGHKEEPSIE, NY 12603

EXAMINER
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THOMAS, TONIAE M

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/828,887

Applicant(s)

LI ET AL.

Examiner

Toniae M. Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9-16 is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

1. This action is responsive to the amendment filed on 24 July 2006.
2. Currently, claims 1-16 are pending.
3. Upon further consideration, the allowability of claims 1-6, as indicated in the previous Office action mailed on 06 April 2006, is withdrawn in view of the application publication US 2001/0021545 A1 to Houlihan et al., which applicant submitted previously (see information disclosure statement filed on 21 July 2004). Rejections based on the Houlihan et al. reference follow.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Houlihan et al. (US 2001/0021545 A1).

The Houlihan et al. application publication (referred to hereinafter as Houlihan) discloses a method of forming a semiconductor device (see figs. 1-10 and accompanying text). The method comprises: forming a silicon dioxide layer 2 on a semiconductor substrate 1 (fig. 1 and par. 0038, lines 1-4); forming a silicon nitride layer 3 on the silicon dioxide layer (fig. 1 and par. 0038, lines 7-

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8); forming isolation trench regions 4 in the substrate (fig. 1 and par. 0038, lines 9-12); removing the silicon nitride layer (fig. 2 and par. 0039, lines 1-3); first implantation of dopant through said silicon dioxide to form sacrificial implanted silicon dioxide layer 2 (fig. 3 and par. 0040); second implantation of dopant through the sacrificial implanted silicon dioxide layer to form p-type wells (fig. 5 and par. 0041, lines 4-5); and removing the sacrificial implanted silicon dioxide layer 2 (fig. 7 and par. 0043, lines 1-5) and forming a gate dielectric layer 9 over the substrate (fig. 8 and par. 0044, lines 1-3).

The silicon dioxide layer 2 can be formed to a thickness of approximately about 25 Å - 20 Å (par.0038, lines 4-7).

The first implanted dopant comprises n- type ions (par. 0040).

The second implanted dopant comprises p-type ions (par. 0041, lines 4-5).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houlihan et al. (US 2001/0021545 A1).

While Houlihan discloses that the first implanted dopant comprises n-type ions, Houlihan does not explicitly teach that the n-type ions are As<sup>+</sup> or P<sup>+</sup>, as recited in claim 4. However, As (arsenic) and P (phosphorus) are well-known n-type dopants. Since As and P are well-known n-type dopants, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to use one of As and P for the n-type dopants.

Houlihan does not teach the energy, dosage, or angle at which the n-type dopant is implanted. However, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to implant the n-type dopant at an implant energy, dosage, and angle within the ranges recited in claim 5, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233).

#### ***Allowable Subject Matter***

6. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 9-16 are allowable over the prior art of record. The closest prior art of record, Houlihan, does not anticipate, teach or suggest a first implantation and a second implantation, wherein n-type/As dopants are implanted in both the first and second implantations.


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (571) 272-1846. The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 5:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Zandra Smith can be reached on (571) 272-2429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TMT  
15 October 2006



M. Wilczewski  
Primary Examiner  
TC2800